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EXAMINER

STEELMAN, MARY J

ART UNIT PAPER NUMBER

2191

DATE MAILED: 10/12/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/993,991

Applicant(s)

MOORE ET AL.

Examiner

Mary J. Steelman

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 22 July 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-15 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-15 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 22 July 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input checked="" type="checkbox"/> Other: <u>Copy of accepted drawing.</u> |

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DETAILED ACTION

1. This Office Action is in response to Remarks and Amendments received 22 July 2005. Per Applicant's request, claims 1-3, 6-8, 11, 14, and 15 have been amended. Claims 1-15 are pending.

Oath/Declaration

2. In view of receipt of a new oath, the prior objections to the oath are hereby withdrawn.

Drawings

3. In view of Replacement Sheet for FIG. 1, the prior objection to the drawings is hereby withdrawn.

Claim Objections

4. In view of the amendments to claims, the prior objections are hereby withdrawn.
Examiner suggests the correction of three minor typos at:
Claim 8, line 3: "an downgraded", should be --a downgraded--
Claim 14, line 18: "data from to a second", should be --data to a second--
Claim 15, line 16: "sate data", should be --state data--

Claim Rejections - 35 USC § 112

5. In view of the amendments to claim 1, the prior 35 USC 112 second paragraph rejection is hereby withdrawn.

Response to Arguments

6. Applicant has argued, in substance, the following:

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(A) As Applicant has noted on page 11, 3rd paragraph of Remarks, received 22 July 2005, “Applicants now claim that the upgraded second version of software runs after the primary processor has quiesced. In this way, only one version of software is running at [a] time. On the other hand, Holte-Rost teaches that the old release and the new release of software are active and running at the same time.”

Examiner’s Response: See Applicant’s Specification, page 9, line 8. The primary controller attempts to ‘gracefully shutdown’. Examiner understands that phrase to mean that a primary controller essentially finishes its processes as best as possible, while at the same time a secondary controller is invoked to begin a continuation of execution. In no case can a graceful shutdown be construed to be stopping one version before beginning a second version. Holte-Rost discloses a synchronization of state transfer between processes, old to new, using several operations (col. 4, line 32-col. 5, line 12). In fact, at a particular stage (CommitTakeover) of Holte-Rost’s invention, only one version is running. CommitTakeover is described at col. 8, lines 5-11. At this stage, the upgraded second version (new process) runs and the primary processor has quiesced (old software is blocked and removed). See FIG. 4, Phase 6 which depicts only the new software version executing. FIG. 4 discloses the limitations of claim 1, “quiescing the primary controller” (Phase 4 & Phase 5) and “operating the upgraded second version of a control application on the second controller after the quiescing of the primary controller...” (Phase 6).

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(B) As Applicant has noted on page 12, 2nd paragraph, Holte-Rost does not disclose the conversion of the state data.

Examiner's Response: Examiner disagrees. Col. 3, lines 41-42, "A smooth change which transfers states to a new version is accomplished...", (col. 3, lines 50-54): By means of different synchronization signals the new software will be able to access the states...", (col. 4, line 32-col. 5, line 12): "...means to synchronize the state transfer of static processes within the old to the new...comprises the following operations.." FIG. 6 and related text at col. 9, lines 1-67 disclose the synchronization of state transfer using a state transfer interface for conversion of the state data.

(C) As Applicant has noted on page 12, last paragraph, Applicants disagree that downgrading software is equivalent to upgrading.

Examiner's Response:

Holte-Rost does not necessarily address the direction of version change, whether upgrading or downgrading (reverting to a former process), only the fact that as a process is changed from one to another, and that the state is synchronized (col. 4, line 32-col. 5, line 12) using various operations.

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

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(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. Claims 1, 4-6, and 9-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over US Patent 6,101,327 to Holte-Rost et al.

Per claim 1:

A checkpointing method of stabilizing a wireless communication systems during an upgrade of services, the wireless communication system having a primary controller comprising a first version of a control application, a secondary controller comprising a replicated first version of a control application, and a checkpointing service, the method comprising the steps of:

(Col. 4, lines 31-33, "The method...provides means to synchronize (checkpointing) the state transfer of static processes within the old to the new version (upgrade) of software", col. 5, lines 40-41, "...to be used in a SPC (stored program control / controllers) telecommunications exchange system...", col. 6, lines 1-3, "The software that is most frequently replaced or upgraded...ISDN, GSM (global system for mobile communications / wireless) ...")

-operating the first version of a control application by the primary controller to control the wireless communication system;

(Col. 6, lines 11-12, "...normal traffic runs on the old version of software.")

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-saving state data..., wherein the state data is representative of a stable operation of the wireless communication system,

(Col. 7, lines 4-8, "...the old software will by means of that signal be aware...and prepares for the transfer of states (save state). The old static process publishes or activates an application defined interface for transferring the state...")

-wherein the ... state data is compatible with the first version of a control application;

(Col. 7, lines 6-8 & 12-13, "...old software static process publishes or activates an application defined interface (compatible interface for state data) for transferring the state... With publication is meant defining (compatibility) the way the process communicates with other processes...", "The old static process may also inform neighboring processes (compatibility) ... about a forthcoming termination...")

-utilizing the checkpointing service to save the first format of the state data to the secondary controller;

(Col. 9, lines 28-32, "Before the upgrading procedure starts traffic will run as normal on the old software... the old static process is informed about the forthcoming termination due to system upgrade with the operation PrepareShutdown (checkpointing service), after which the application activates or publishes the interface for state transfer (save state and prepare to transfer to secondary processor)...")

-upgrading the replicated first version of a control application on the second controller to create an upgraded second version of a control application;

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(Col. 6, lines 20-21, “The software to be replaced is referred to as a change unit”, col. 6, lines 34-36, “Thereafter all ‘new’ traffic initiated after the test traffic has come to an end will be handled by the new software (upgrade to the second version) .”

-quiescing the primary controller;

(Col. 8, lines 2-4, “After the CommitShutdown signal has been given all traffic will be handled by the new version...”)

-operating the upgraded second version of a control application on the second controller after quiescing of the primary controller to control the wireless communication system;

(Col. 8, lines 6-11, “...the new process now is the sole owner of the resource objects... This is indicated by the CommitTakeover signal... when the system upgrade function is committed...”)

-converting the saved first format state data to a second format of the state data, wherein the second format of the state data is compatible with the upgraded second version of a control application;

(Col. 7, lines 42-44, “the static processes within the new software are ordered to claim all resource objects of the static processes within the old software with a Takeover signal (all saved state is transferred to the new version)”, col. 6, lines 30-35, “The new change unit (new version) is by definition chosen to have an interface that is compatible... the unchanged software (old version) is able to cooperate with both the old and the new software version (change unit)” The interfaces handle format compatibility.)

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-operating the upgraded second version of a control application to control the wireless communication system,

(Col. 8, lines 6-10, "CommitTakeover signal...upgrade function is committed (second version of control application controls system)...")

-wherein the second version utilizes the converted second version of the state data to ensure wireless communication stability.

(Col. 8, lines 6-8, "the new process (second version) now is the sole owner of the resource objects (converted state data) previously claimed from the old process.", col. 3, lines 56-59, "Principal requirements satisfied by the smooth software change techniques with state transfer of the present invention include minimal or no user disturbance and a high level of system availability (ensure stability).")

Holte-Rost failed to disclose specifically a "first format" and a "second format" for the saved state. However, he did indicate that state was saved and using a synchronizing interface that enforced compatibility, state was transferred to the new version. Col. 4, lines 38-48, "PrepareShutdown...prepares the application...After receiving the ...signal the static process in the old software publishes or activates an application specific interface for the transfer of resource objects (states). A resource object is an object type whose main purpose is to handle information on a hardware resource or an internal data structure..." Therefore, it would have been obvious, to one of ordinary skill in the art, at the time of the invention, to understand that Holte-Rost's resource object was storing the

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state in a 'first format' and after the transfer of the resource object the state was synchronized to a 'second format'.

Per claim 4:

A method as defined in claim 1, wherein the wireless communication system comprises a network element.

(FIG. 2, col. 5, lines 20-21, "shows the system architecture in a general telecommunications system." GSM is global system for mobile communications (wireless). Col. 5, lines 41-47, A general telecommunication system, including a switch, distributed processors (network elements)...the switch is connected to one or more processors...")

Per claim 5:

A method as defined in claim 4, wherein the network element is an element selected from the group consisting of a Base Transceiver Station (BTS), a Mobile Switching Center (MSC), a Base Station Controller (BSC), a Centralized Base Station Controller (CBSC), a Radio Network Controller (RNC), a Gateway Switching Node (GSN), a Node B, and a mobile unit.

(FIG. 2, col. 5, lines 20-21, "shows the system architecture in a general telecommunications system." GSM is global system for mobile communications (mobile unit). Col. 5, lines 41-47, A general telecommunication system, including a switch (mobile switching center / gateway switching node)), distributed processors (network elements)...the switch is connected to one or more processors...")

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Per claim 6:

A checkpointing method of stabilizing a wireless communication systems during a downgrade of services, the wireless communication system having a primary controller comprising a first version of a control application, a secondary controller comprising a replicated first version of a control application, and a checkpointing service, the method comprising the steps of:

- operating the first version of a control application by the primary controller to control the wireless communication system;
- saving state data in a first format, wherein the state data is representative of a stable operation of the wireless communication system, and wherein the first format of the state data is compatible with the first version of a control application;
- utilizing the checkpointing service to save the first format of the state data to the secondary controller;
- downgrading the replicated first version of a control application on the second controller to create a downgraded second version of a control application;
- converting the saved first format of the state data to a second format of the state data, wherein the second format of the state data is compatible with the downgraded second version of a control application;
- quiescing the primary controller;
- operating the downgraded second version of a control application to control the wireless communication system;

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-operating the second version of a control application to control the wireless communication system, wherein the second version utilizes the converted state data to ensure wireless communication stability.

The limitations of claim 6 are similar to claim 1 except that claim 6 calls for a downgrade as compared to an upgrade as claimed in claim 1. Holte-Rost does not necessarily address the direction of version change, whether upgrading or downgrading (reverting to a former process), only the fact that as a process is changed from one to another, and that the state is synchronized (col. 4, line 32-col. 5, line 12) using various operations.

Official notice is given that a downgrade is a modification from one software version to another software version and as such the rejection of claim 1 applies. Furthermore, Holte-Rost disclosed reversion of software. See FIG. 5. Col. 8, lines 21-22, "The reversion during system upgrade can be carried out at any time prior to the CommitShutdown signal...")

Per claim 9:

A method as defined in claim 6, wherein the wireless communication system comprises a network element.

(See rejection of limitations as addressed in claim 4 above.)

Per claim 10:

A method as defined in claim 9, wherein the network element is an element selected from the group consisting of a Base Transceiver Station (BTS), a Mobile Switching Center

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(MSC), a Base Station Controller (BSC), a Centralized Base Station Controller (CBSC), a Radio Network Controller (RNC), a Gateway Switching Node (GSN), a Node B, and a mobile unit.

(See rejection of limitations as addressed in claim 5 above.)

Per claim 11:

An apparatus for ensuring wireless communication stability during an update of a wireless communication system, the apparatus comprising:

- a first computer processor running a first version of control software, the first computer processor further having a first database capable of saving state data in a first version format representative of steady state operation;
- a second computer processor running a second version of control software, the second computer processor further having a second database capable of receiving the state data from the first database in a second version format to replicate the steady state operation of the first computer processor wherein the second computer processor running the second version of control software after the first computer processor has quiesced running the first version of control software;
- a checkpointing service to transfer the steady state data from the first database to the second database; and a control block to translate the steady state data from the first version format to the second version format.

Claim 11 is an apparatus version of claim 1. FIG. 2 shows the system architecture (apparatus) in a general telecommunications system. Col. 5, lines 39-47, "...used in a

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SPC telecommunications exchange system (apparatus)..." Claim 11 also requires database storage. Holte-Rost disclosed storage at col. 3, line 39-41, "...transaction oriented software together with a memory capable of storing (database) both old and new software version at the same time. The rejections, as addressed in claim 1, apply to claim 11.

Per claim 12:

An apparatus as defined in claim 11, wherein the wireless communication system comprises a network element.

(See rejection of limitations as addressed in claim 4 above.)

Per claim 13:

An apparatus as defined in claim 12, wherein the network element is an element selected from the group consisting of a Base Transceiver Station (BTS), a Mobile Switching Center (MSC), a Base Station Controller (BSC), a Centralized Base Station Controller (CBSC), a Radio Network Controller (RNC), a Gateway Switching Node (GSN), a Node B, and a mobile unit.

(See rejection of limitations as addressed in claim 5 above.)

Per claim 14:

A checkpointing method of stabilizing a system during an upgrade of services, the system having a primary controller comprising a first version of a control application, a

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secondary controller comprising a replicated first version of a control application, and a checkpointing service, the method comprising the steps of:

- operating the first version of a control application by the primary controller to control the system;
- saving state data in a first format, wherein the state data is representative of a stable operation of the system, and wherein the first format of the state data is compatible with the first version of a control application;
- utilizing the checkpointing service to save the first format of the state data to the secondary controller;
- upgrading the replicated first version of a control application on the second controller to create an upgraded second version of a control application;
- quiescing the primary controller;
- operating the upgraded second version of a control application on the second controller after the quiescing of the primary controller to control the system;
- converting the saved first format of the state data from to a second format of the state data, wherein the second state data format is compatible with the upgraded second version of a control application;
- operating the upgraded second version of a control application to control the system, wherein the second version utilizes the converted second version of the state data to ensure stability.

(See rejection of limitations as addressed in claim 1 above. Claim 14 more broadly has the limitation of “the system” in comparison to “wireless communications system” of

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claim 1. The Holte-Rost invention is not limited to a wireless system, thus the reference is applicable as prior art.)

Per claim 15:

A checkpointing method of stabilizing a system during a downgrade of services, the system having a primary controller comprising a first version of a control application, a secondary controller comprising a replicated first version of a control application, and a checkpointing service, the method comprising the steps of:

- operating the first version of a control application by the primary controller to control the system;
- saving state data in a first format,
- wherein the state data is representative of a stable operation of the system, and wherein the first format of the state data is compatible with the first version of a control application;
- utilizing the checkpointing service to save the first format of the state data to the secondary controller;
- downgrading the replicated first version of a control application on the second controller to create a downgraded second version of a control application;
- converting the saved first format of the state data to a second format of the state data, wherein the second format of the state data is compatible with the downgraded second version of a control application;
- quiescing the primary controller;
- operating the downgraded second version of a control application to control the system;

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-operating the second version of a control application to control the system, wherein the second version utilizes the converted second version of the state data to ensure stability.

(See rejection of limitations as addressed in claim 6 above. (Claim 15 more broadly has the limitation of “the system” in comparison to “wireless communications system” of claim 6. The Holte-Rost invention is not limited to a wireless system.)

9. Claims 2, 3, 7, and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over US Patent 6,101,327 to Holte-Rost et., in view of US Patent 5,666,293 to Metz et al.

Per claim 2:

A method as defined in claim 1, wherein the wireless communication system further has a version control table containing the version number for the first version of a control application on the primary controller and the replicated first version of a control application.

Holte-Rost is certainly aware that differing versions exist. Holte-Rost disclosed (col. 4, lines 25-26, “The present invention provides a mechanism to identify which software version is to be used during system upgrade...” Holte-Rost failed to specifically disclose a “version control table containing the version number or the first version of a control application and the second version of a control application.”

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However, Metz disclosed (col. 36, lines 31-36) “The DET microprocessor 110 examines the data in the network table (version table) associated with the particular type of set-top to identify the current operating system version number being broadcast for the particular type and/or model of set-top terminal. The system memory 120 also stores a version number for the operating system the DET microprocessor 110 is currently running. The DET microprocessor 110 compares the operating system version number in the network table with the operating system version number stored in its associated system memory 120 to determine whether or not they match. If they match, an operating system upgrade is not necessary at this time,

Therefore, it would have been obvious, to one of ordinary skill in the art, at the time of the invention, to modify Holte-Rost by including more details regarding a version table and comparison of version numbers as disclosed by Metz, because both references refer to downloading / updating / upgrading operating system software in a reliable and secure manner (Metz, col. 4, lines 34-35) (Holte-Rost, col. 3, lines 23-24), ensuring compatibility, thus allowing for changes in versions as desired.

Per claim 3:

A method as defined in claim 2, wherein the step of upgrading the replicated first version of a control application on the second controller thereby creating an upgraded second version of a control application further comprises the steps of:

-updating the version control table with the new version number of the upgraded second version of a control application;

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-comparing the version number for the replicated first version of a control application on the secondary controller to the version number for the upgraded second version of a control application on the secondary controller to determine the upgraded second version of a control application has been upgraded.

Holte-Rost is certainly aware that differing versions exist. Holte-Rost disclosed (col. 4, lines 25-26, "The present invention provides a mechanism to identify which software version is to be used during system upgrade..." Holte-Rost failed to specifically disclose a "version control table containing the version number or the first version of a control application and the second version of a control application."

However, Metz disclosed (col. 36, lines 31-36) "The DET microprocessor 110 examines the data in the network table (version table) associated with the particular type of set-top to identify the current operating system version number (comparing the version number...to determine whether the second version has been upgraded) being broadcast for the particular type and/or model of set-top terminal. The system memory 120 also stores a version number for the operating system the DET microprocessor 110 is currently running. The DET microprocessor 110 compares the operating system version number in the network table with the operating system version number stored in its associated system memory 120 to determine whether or not they match. If they match, an operating system upgrade is not necessary at this time..."

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Therefore, it would have been obvious, to one of ordinary skill in the art, at the time of the invention, to modify Holte-Rost by including more details regarding a version table and comparison of version numbers as disclosed by Metz, because both references refer to downloading / updating / upgrading operating system software in a reliable and secure manner (Metz, col. 4, lines 34-35) (Holte-Rost, col. 3, lines 23-24), ensuring compatibility, thus allowing for changes in versions as desired.

Per claim 7:

A method as defined in claim 6, wherein the wireless communication system further has a version control table containing the version number for the first version of a control application and the replicated first version of a control application on the secondary controller.

(See rejection of limitations as addressed in claim 2 above.)

Per claim 8:

A method as defined in claim 7, wherein the step of downgrading the replicated first version of a control application on the secondary controller thereby creating an downgraded second version of a control application further comprises the steps of: updating the version control table with the new version number of the downgraded second version of a control application; and comparing the version number for the replicated first version of a control application on the secondary controller to the downgraded second version of a control application on the secondary controller to determine the downgraded second version of a control application has been downgraded.

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(See rejection of limitations as addressed in claim 3 above.)

Conclusion

10. THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Conclusion

11. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Mary Steelman, whose telephone number is (571) 272-3704. The examiner can normally be reached Monday through Thursday, from 7:00 AM to 5:30 PM. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wei Zhen can be reached at (571) 272-3708. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Any inquiry of a general nature or relating to the status of this application should be directed to the TC 2100 Group receptionist: 571-272-2100.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Mary Steelman



10/05/2005

WEI Y. ZHEN
PRIMARY EXAMINER



Accepted by Examiner
4/5 10-05-05



1/4

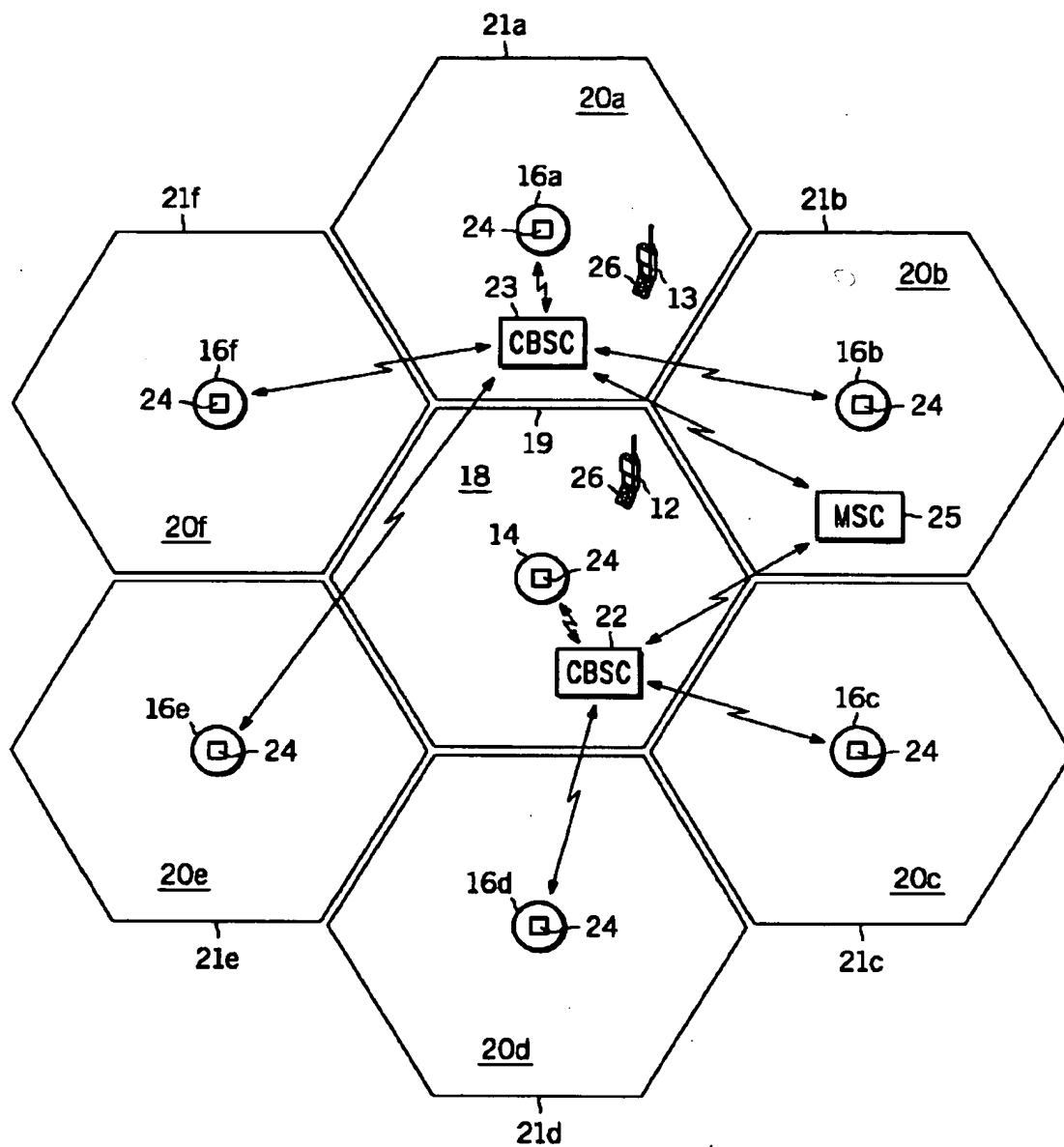


FIG. 1

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